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## METHOD AND SYSTEM FOR SWITCHING BETWEEN WINDOWS IN A MULTIWINDOW COMPUTER ENVIRONMENT

### FIELD OF THE INVENTION

The present invention relates to multiwindow computer environments, and more specifically to a method and system for switching between windows in a multiwindow computer environment.

### BACKGROUND OF THE INVENTION

Modern operating systems having a graphical user interface, such as Windows™ and Macintosh™, are capable of displaying a re-sizable, movable window for each application executing on a computer. A user interacts with the applications using a keyboard and a pointing device, such as a mouse. Although multiple application windows may be simultaneously displayed, only one application window may be active (in the foreground) at any one time. When tasks in two or more windows are related to each other, the user will take advantage of this multiwindow capability to sequentially work between one or more related applications opened simultaneously in order to multitask. An example of multitasking between related applications is juggling a video editing application in

concert with a music editing application and a graphics design application, all being used interactively.

Figure 1 is a diagram of a conventional computer desktop 10 displaying multiple application windows. Three application windows 12a-c (collectively 12) are shown, each having multiple objects and fields 14a-c (collectively 14) in distinct locations in which the user is required to select or enter application-specific data. A single mouse pointer 16 is displayed that the user may freely move about the desktop 10 and use to select and make active any window 12 of interest. Positioning the mouse pointer 16 over any part of a window 12a and clicking a mouse button (not shown) causes that window 12a, and hence its application, to become active (and highlighted). In response, the other windows 12b and 12c become inactive (grayed out). A second click in the active window 12a is required to select a field 14a or other object inside the window 12a.

In order to work between the application windows 12, the user must move the mouse pointer 16 away from the current field 14a in the active window 12a to another window 12b of interest and then click the mouse to activate the window. The user must then position the mouse pointer 16 and a field 14b of interest within the new active window 12 and click the mouse again. Because the applications typically have very different user interfaces, the fields 14 displayed in each window 12 are not positioned in similar locations. Therefore, the operation requires a high degree of concentration, hand-eye coordination, and tiresome eye-focusing to switch between the fields 14 of the different application windows 12, often impairing the creative process.

What is needed is an improved method and system for switching between windows in a multiwindow computing environment. The present invention addresses such a need.

## SUMMARY OF THE INVENTION

The present invention provides a method and system for switching between windows running on a multiwindow computer system that retains the user's points of interest. The method and system includes allowing a user to register at least one specific point of interest in each of the windows, and displaying a persistent mouse pointer on each of the registered points of interest in the inactive windows. In response to the user making one of the inactive windows active, an active mouse pointer is displayed at the location of the persistent mouse pointer in that window.

According to the method and system disclosed herein, while the user is working in an active window, the persistent mouse pointers provide constant feedback of where the user left-off in the inactive windows. And because the active mouse pointer is automatically positioned at the location of one of the persistent mouse pointers when the user switches to a new window, the need for the user to search for and select his or her last position in that window is eliminated.

## BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagram of a conventional computer desktop displaying multiple application windows.

Figure 2 is a block diagram illustrating a multiwindow computer system for use in accordance with the present invention.

Figure 3 is a flow chart illustrating a process for retaining points of interest when switching between windows in a preferred embodiment of the present invention.

Figure 4 is a block diagram illustrating the computer system displaying multiple application windows in accordance with the present invention.

Figure 5 is a block diagram of the multiwindow mouse in accordance with a preferred embodiment of the present invention.

Figure 6 is a block diagram illustrating a second embodiment of a multiwindow mouse.

Figure 7 is a flow chart illustrating the process of registering a point of interest in accordance with a preferred embodiment of the present invention.

## DETAILED DESCRIPTION

5           The present invention relates to methods for switching between software application windows in a multiwindow computer environment. The following description is presented to enable one of ordinary skill in the art to make and use the invention and is provided in the context of a patent application and its requirements. Various modifications to the preferred embodiments and the generic principles and features described herein will be readily apparent to those skilled in  
10           the art. Thus, the present invention is not intended to be limited to the embodiments shown but is to be accorded the widest scope consistent with the principles and features described herein.

15           Figure 2 is a block diagram illustrating a multiwindow computer system for use in accordance with the present invention. The computer system 50 includes a computer 52 such as a PC or workstation, having several peripheral devices including a display screen 54, and a keyboard 56. The peripheral devices require  
20           respective device drivers 58 that provide the instructions necessary to activate and control the device.

25           The computer 52 includes an operating system 60 that is capable of simultaneously executing multiple application programs and displaying corresponding windows 62a and 62b (collectively 62) on the screen. As stated above, when switching between the two windows 62, the user must move a mouse pointer 64 from a specific point of interest in the first window 62a to a specific point of interest in the second window 62b. Because the mouse pointer 64 is moved to the newly activated window 62b, the user's last working position in the first window 62a is lost. Consequently, when the user switches back from the second to the first

5 window 62a, the user must remember and search for the last position to begin  
working where he or she left off.

To overcome this problem, the present invention provides the computer  
system 10 with a multiwindow mouse 66 and a multiwindow device driver 68 that  
retains the user's points of interest when switching between the windows 62.

Figure 3 is a flow chart illustrating a process for retaining points of interest  
when switching between windows in a preferred embodiment of the present  
invention. According to the present invention, the multiwindow device driver 68  
allows the user to register a specific point of interest 70 for each open window 62  
on the desktop in step 80. Figure 4 is a block diagram illustrating the computer  
system 10 displaying multiple application windows in accordance with the present  
invention, where like components of Figure 2 have like reference numerals. Two  
application windows 62 are shown in which the user has registered a respective  
point of interest 70a and 70b (collectively 70).

Referring to both Figures 3 and 4, in addition displaying an active mouse  
pointer 64, the multiwindow device driver 68 also displays a persistent mouse  
pointer 72 on each registered point of interest 70 regardless of which window is  
active in step 82. When the user moves the active mouse pointer 64 from the active  
window 62a to the inactive window 62b and clicks the multiwindow mouse 66 in step  
84, the active mouse pointer 64 will be displayed at the location of the persistent  
mouse pointer 72 in that window 62b. While the user is working in the active  
window 62a, the persistent mouse pointer 72 provides constant feedback of where  
the user left-off in the inactive window 62b. And because the multiwindow device  
driver 68 automatically positions the active mouse 64 at the location of the  
persistent mouse pointer 72 when the user switches windows 62, the need for the  
user to search for and select such locations is eliminated.

In a preferred embodiment, the user may also register multiple points of interest 70 within a window 62, which is optimized when there is only one open window 62. In this case, the user can move between frequently used points of interest 70 within that window 62 making it easy to access commonly used functions.

Figure 5 is a block diagram of the multiwindow mouse 66 in accordance with a preferred embodiment of the present invention. The multiwindow mouse 66 operates as a conventional mouse and includes standard left and right buttons 86, but is also provided with a joystick 88 that allows the user to switch between the windows 62. In operation, the user presses the joystick 88 to the left or to the right to move between registered points of interest 70 within open windows 62. With each movement of the joystick 88, the multiwindow mouse driver 68 brings the active mouse pointer 64 to the specific location where the user left it before switching windows 62. In an alternative embodiment, the joystick 88 may be replaced by two buttons (not shown); a registration button to register a point of interest 70, and a toggle button to move between the points of interest 70.

Figure 6 is a block diagram illustrating a second embodiment of a multiwindow mouse. In this embodiment, the multiwindow mouse 90 is implemented as a twin-mouse configuration. Two mice are coupled together and each mouse is dedicated to one open window 62 or a set of open windows 62. The user may use each mouse to switch between multiple points of interest 70 in the corresponding window 62, or the user may use each mouse to switch between points of interest 70 in a corresponding set of windows 62. In an alternative embodiment, the conventional mice in the twin-mouse configuration may be replaced by the multiwindow mouse 66 shown in Figure 4 to form a twin-headed multiwindow mouse configuration.

In a preferred embodiment, the multiwindow device driver 68 provides the functionality for allowing the user to register points of interest. The driver 68 can be

programmed to give the user a choice of registering points of interest 70 by pressing the joystick 88 while performing a right click, or by remapping the right mouse button to set and delete points of interest 70.

5           Figure 7 is a flow chart illustrating the process of registering a point of interest in accordance with a preferred embodiment of the present invention. The process begins when the user positions the active mouse pointer 64 at a desired location in an active window 62 in step 150. In response to the user pressing a predefined button on the mouse 66, the multiwindow device driver 68 displays a dialog box that displays a list of commands for user selection in step 152. In a preferred embodiment, the displayed commands include "Set POI" and "Delete POI".

10           If the user selects the command to set a point of interest 70, then the multiwindow device driver 68 stores the x and y coordinates of the point of interest 70 in step 154. In a preferred embodiment, the multiwindow device driver 68 stores the x and y coordinates, an ID of the active window, and an ID of the next window 62 in a linked list of registered points. For the twin-mouse configuration, an ID of the mouse used to set the point of interest 70 may also be stored. If the user selects the command to delete a point of interest 70, then the registered point of interest 70 is deleted in step 156.

15           In an alternative preferred embodiment, the multiwindow device driver 68 also enables the user to set and delete points of interest using hotkey sequences on the keyboard.

20           The method of the present invention may be extended to registering favorite applications and the arrangement of the application windows on the desktop, as well as points of interest 70 within the registered applications. In this embodiment, when the computer is booted, the applications may be automatically opened in the specified window arrangement with the locations of the registered points of interest 70 indicated by the persistent mouse pointers 72.

